GROUND WATER MONITORING PLAN

EMD MILLIPORE CORPORATION
CINCINNATI, OHIO

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Prepared For

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1.0 INTRODUCTION

EMD Millipore Corporation, formerly known as EMD Chemicals Inc., (EMD) entered into a Voluntary Corrective Action Agreement (VCAA) with the United States Environmental Protection Agency (U.S. EPA), Region 5, to address releases of hazardous waste or hazardous constituents at its facility located at 2909 Highland Avenue, Cincinnati, Ohio (Property). U.S. EPA submitted the Notification of Final Decision to EMD on November 5, 2008, and issued the fully executed copy of the 3008(h) Administrative Order on Consent (AOC) and Certificate of Incumbency on March 31, 2010.

This Ground Water Monitoring Plan (GWMP) has been prepared on behalf of EMD to specify the ground water monitoring approach on and off the property since the completion of the final corrective measures at the Property. This GWMP summarizes the performance monitoring activities for the next five years of ground water monitoring at the Property. The main objective of the GWMP is to collect the sufficient ground water data needed to make the appropriate determinations required by the RCRA Ground Water Migration Under Control Environmental Indicator (CA 750), determine current conditions in ground water, and evaluate the efficacy of existing ground water collection interim measures.

2.0 PERFORMANCE MONITORING AND FREQUENCY

As specified in the AOC, interim performance monitoring will be conducted as part of the final corrective measures to evaluate and demonstrate that the performance standards will be met by the completion of the final corrective measures implemented at the Property. The interim performance monitoring will consist of the following:

- Ground water levels will be recorded quarterly (January, April, July, and October) during the first year (2014) to demonstrate that hydraulic control is being achieved by the corrective measures and to establish a baseline for ground water flow post completion of the remedy. Water levels will be recorded from all monitoring wells on and off the property during 2014. Figure 1 and Table 1 identifies the wells that will be utilized for these ground water level measurements. At the completion of the last quarterly ground water measurement event, the data will be evaluated to establish a baseline ground water flow (post remedy), and determine a subset list along with frequency of recordings.
- For the calendar years 2015, 2016, 2017, and 2018, water level measurements will be recorded from a subset of the monitoring wells listed in Table 1 (referenced above). The subset well list and reduced frequency will be implemented during the remaining four years to monitor for significant departures from the first year (2014) baseline analysis. This subset list of monitoring wells will be selected to ensure that hydraulic capture and containment is still being maintained and that no indication of departures from the hydraulic containment are occurring. This subset list and frequency will be provided to the U.S. EPA for review and concurrence.
- Ground water sampling for chemicals of concern (COCs) will be conducted on and off the Property at selected monitoring wells identified to evaluate the effectiveness of the containment associated with the corrective measures implemented at the Property. The attached Table 2 and Figure 1 identifies

the ground water monitoring well locations. Ground water samples will be collected on a semi-annual (twice per year) for the first three (2014, 2015, and 2016) years post-implementation of corrective measures. The monitoring events will correspond with two of the water level events and will be conducted during typically high precipitation period (April/May) and low precipitation period (October/November).

- At the end of year three (2016), the first three years of COC ground water sampling data will be evaluated to assess if containment is being achieved and a future monitoring strategy. If the first three years of data suggest the ground water COC concentrations are stable or decreasing, annual ground water monitoring will be conducted during the fourth (2017) and fifth (2018) years.

3.0 LIST OF CONTAMINANTS TO BE MONITORED

Ground water and surface water samples will be collected into three 40-milliliter containers, and will be analyzed for volatile organic compounds (VOCs) by U.S. EPA Method SW-846 8260B (Appendix IX list plus total 1,2-dichloroethene, cis-1,2-dichloroethene, and trans-1,2-dichloroethene) per procedures summarized in the Quality Assurance Project Plan (QAPP) for the EMD Chemicals Inc. RCRA Voluntary Corrective Action (June 1, 2004). As summarized in the project QAPP, a lowered detection limit for 1,4-Dioxane (50 ug/L) has been communicated to the project laboratory for the duration of this project. Each sample container will be provided by the analytical laboratory, and will be preserved with hydrochloric acid for VOC samples. Each sample will be cooled to 4° Celsius after collection for shipment via chain-of-custody control.

4.0 GROUND WATER MONITORING SAMPLING LOCATIONS

Fifty monitoring wells are located on the Property, and twenty-six monitoring wells are located south and east of the Property along State Route 562 and Interstate 71. These well locations are shown on Figure 1. Of the 76 monitoring well network, 18 on-Property monitoring wells and 17 off-Property monitoring wells (totaling 35) will be sampled for the performance monitoring. The 35 monitoring wells will be sampled semi-annual during the first three years (2014, 2015, and 2016) monitoring event. In addition, 2 surface water samples will be collected at the Duck Creek Box Culvert Inflow and Outflow (see Figure 1).

Several on-Property monitoring wells were abandoned in 2009. The wells were abandoned since they were in close proximity or within the area designated for sewer line and ground water collection trench system construction activities recently installed at the facility. The replacement of these wells were conducted early in 2014.

Monitoring well locations and surface water sampling locations are highlighted in Figure 1 and listed in Table 2.

5.0 GROUND WATER SAMPLING PROCEDURE

The field activities associated with ground water monitoring will follow the project-specific QAPP (June 1, 2004), the site-specific Health and Safety Plan (H&S Plan), and TRC's Standard Operating

Procedures (SOPs) for Well Purging, Ground Water Sampling, and Decontamination of Water Sampling Equipment (SOP 6-1). The Payne Firm's/TRC SOPs are consistent with the May 2002 U.S. EPA guidance document "Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers." The methodology will consist of the following primary elements:

- Prior to sampling a monitoring well, appropriate measurements such as the static water level, total well depth, volume of water in the well, and ground water elevation will be made.
- A submersible pump (QED Well Wizard® Bladder Pump or Monsoon®) with dedicated Teflon tubing, peristaltic pump, or disposable bailer will be slowly lowered into the well to a point within the well screen interval.
- Each well will be purged following the low flow purging methods described in the SOP unless purged and sampled with a disposable bailer (offsite wells). During well purging, water quality parameters (temperature, pH, specific conductance, oxidation-reduction potential [ORP], dissolved oxygen, and turbidity) will be recorded from an in line flow-through cell every 3 to 5 minutes after a minimum of one tubing volume of water has been removed. Purging may cease when measurements for all parameters have stabilized for three consecutive measurements. Stabilization criteria for the water quality parameters is as follows (U.S. EPA 2002):

    i. pH: +/- 0.1
    ii. specific conductance: +/- 3% S/cm
    iii. dissolved oxygen: +/- 0.3 milligrams per liter
    iv. oxidation-reduction potential: +/- 10 millivolts
    v. turbidity: +/- 10% (when turbidity is > 10 NTUs).

    The flow rate during purging will initially be low (0.2 to 0.5 liter per minute); the flow rate can be increased as long as the drawdown in the well does not exceed 0.33 feet.
- Different purging procedures may need to be followed when purging wells that are installed into low hydraulic conductivity aquifers or formations that are not able to yield at least three well volumes during purging. The purge withdraw rate should be as low as possible to minimize the drawdown in the well. If a well has an open interval across the water table in a low permeability zone, there may be no way to avoid pumping and/or bailing the well dry. In this case, the well should be sampled at some appropriate time period such that a sufficient volume of water is in the well for sampling purposes. Equipment such as a peristaltic pump or bailer may be used to purge monitoring wells that will not produce at least three well volumes.
- Sampling methods at each monitoring location will be consistent with historical sampling methods and will be maintained throughout the performance monitoring period. Low flow sampling methods will be utilized at monitoring locations meeting the parameters stated above.
- Stabilization is considered achieved when measurements are within approximately ten percent over two consecutive measurements. For low yielding wells (wells incapable of yielding three casing volumes) whose water level is located below the top of the well screen, the well will be purged to dryness once. As soon as the well recovers sufficiently, one sample will be taken for the measurement of ground water indicator parameters prior to sampling the well.

- Once sufficient water is purged, ground water will be transferred to laboratory supplied containers for analysis of VOCs. Appropriate sample preservation will be added to the ground water samples, according to the particular analysis to be conducted (see Section 5).
- The ground water samples will be appropriately packaged and shipped under proper chain-of-custody procedures to the project laboratory, TestAmerica Laboratories, Inc. (TestAmerica) in North Canton, Ohio.
- Ground water sampling information will be recorded on a ground water sampling form and/or in the project field logbook.

5.1 Sample Handling and Shipment

All samples will be labeled immediately after collection. The information on the sample label will include the project name, sample identification, sample date and time, and the analyses requested. Samples will be packaged and shipped to the project laboratory.

5.2 Field Documentation

A field logbook and a field ground water sampling form will be used to record facts and circumstances of the sampling event. Information recorded in the logbook/field form will include the following:

- Name of sampling personnel;
- Sample location;
- Time and date;
- Weather conditions;
- Sample type (i.e. grab, composite, etc.); and
- Pertinent sample data.

5.2.1 Chain-of-Custody

Chain-of-custody documentation will accompany each sample shipment. The chain-of-custody record will record the project name, type of sample collected, date of sample collection, name(s) of the person(s) responsible for sample collection, date of custody transfer, signature of the person relinquishing and accepting sample custody, analytical procedures to be used, and other pertinent information.

5.2.2 Equipment Decontamination

If non-dedicated sampling equipment is used during this sampling event, the sampling equipment will be decontaminated prior to use at each monitoring well location. As presented in the site-specific H&S Plan, proper personal protective equipment (PPE) will be worn during the decontamination process with gloves disposed of in between decontamination of equipment used on each monitoring well. Decontamination procedures include:

- Disconnect internal pump parts, including Teflon bladder and pump fittings;
- Scrub the exterior of the pump and associated internal pump fittings and Teflon bladder in a non-phosphate detergent solution; (Bucket #1);

- Rinse with distilled water (Bucket #2); and
- Allow to air dry.

Dedicated tubing will be used at each monitoring well location; therefore, it will not be necessary to decontaminate pump tubing between monitoring well sampling locations.

Decontamination solutions will be contained and new solutions used during each day of sampling, or more often if deemed necessary. All decontamination solutions will be contained and properly disposed.

5.2.3 Quality Assurance

Sample collection, quality assurance/quality control procedures, and employment of data quality objectives will be conducted by TRC in accordance with the TRC's SOPs and project-specific QAPP (date). During the monitoring event, the following QA/QC samples will be collected at a minimum:

- One trip blank sample will be shipped with each sample cooler daily containing samples for VOC analysis. Trip blanks are provided by the project laboratory and kept with the sampling containers throughout the day. The trip blank samples will be identified as: TB01/date, etc. The trip blank samples will be analyzed for VOCs.
- Two duplicate samples will be collected. The duplicate samples will be collected from on monitoring well and the Property and one monitoring well off the Property. The duplicate samples will be identified as DUP01/date and DUP02/date, and will be analyzed for VOCs.
- Two matrix spike/matrix spike duplicate (MS/MSD) samples will be collected during the sampling event. MS/MSD samples will be collected at the same monitoring wells the duplicates are collected, and will be analyzed for VOCs. The lab will be provided triple the volume for each with MS/MSD indicated on the chain of custody.
- Two field blank samples will be collected during the sampling event by filling laboratory grade water directly into the appropriate sample containers and will be analyzed for VOCs. The laboratory grade water will be provided by the project laboratory. One field blank will be collected on the Property, and one will be collected off of the Property. The field blank samples will be labeled as FB01/date for the sample collected on the Property, and FB02/date for the sample collected off of the Property property, and will be analyzed for VOCs.
- Equipment rinsate samples will be collected if non-dedicated submersible sample pumps are utilized. The rinsate samples will be collected after the ground water sampling pump has been properly decontaminated at the end of the day. The samples will be collected by pouring laboratory grade water over the sampling pump, and collecting the rinsate off of the pump into the appropriate sample containers. The laboratory grade water will be provided by the project laboratory. The rinsate sample will be labeled as RIN01/date, and will be analyzed for VOCs.

6.0 TARGET CONCENTRATIONS

As specified in the AOC, the risk-based cleanup standards for the point of compliance (i.e., EMD Property boundary) have been determined. This determination is provided in detail in the *Human Health*

Risk Assessment Addendum, November 2005, prepared by CH2MHill. This risk based cleanup standards are based on the assumptions that off-site construction workers may be exposed through dermal contact or by inhalation of vapors from ground water in excavations. The table below summarizes the risk-based cleanup standards:

Chemical of Concern (COC)	Risk-Based Cleanup Standard (mg/L or part per million)
1,2-dichloroethane	13
Cis-1,2-dichloroethene	9.4
1,4-dioxane	1,000
Benzene	2
Tetrachloroethene	0.28
Trichloroethene	3.5
Vinyl chloride	1.25

As summarized in Section 3.0, performance monitoring will be conducted at monitoring wells located along the EMD Property boundary and off Property in the downgradient location to confirm these cleanup standards will continue to be met.

7.0 TERMINATION CRITERIA

Ground water monitoring will be conducted semi-annually through 2016 and water levels will be collected quarterly during 2014.

At the end of year three (2016), the first three years of ground water chemical data will be evaluated to assess containment and the requirement for a future monitoring strategy. If the first three years of data suggest the downgradient contaminant concentrations are stable or decreasing, annual ground water monitoring will be conducted during the fourth (2017) and fifth (2018) years. If the downgradient contaminant concentrations continue to be stable or decreasing at the end of the fifth year (2018) of ground water monitoring, a request will be made to the U.S. EPA to discontinue ground water monitoring on and off the Property.

For the four years after the baseline monitoring (2014), water levels will be recorded from a subset of the well list provided in Table 1 and at a semi-annual frequency to monitor continued hydraulic containment or potential departures from the first year baseline analysis. This subset list of monitoring wells will be selected to ensure that hydraulic capture and containment is still being maintained and that no indication of departures from the hydraulic containment are occurring. This subset list will be provided to the U.S. EPA for review and concurrence. At the end of the fifth year (2018), a demonstration will be provided that the corrective measures have maintained consistent hydraulic containment and a request to terminate future water level events will be made to the U.S. EPA.

8.0 WELL CLOSURE

Monitoring wells, piezometers, remediation wells installed on and off the property will be closed and sealed after the function of the well is completed. The structures will be closed in accordance with the

State of Ohio, Technical Guidance for Sealing Unused Wells (State Coordinating Committee on Ground Water, 1996). A record of water well closure will be filed with the ODNR.

9.0 REPORTING

The results of the Performance Monitoring, visual inspections and monitoring of the effluent will be reported to the U.S. EPA on a quarterly basis in the Quarterly Progress Reports which EMD has been submitting to the Agency under Condition VII.B of the Voluntary Corrective Action Agreement. This reporting frequency may be modified with discussions between the U.S. EPA and EMD.

10.0 REFERENCES

The Payne Firm Inc., *Quality Assurance Project Plan (QAPP) for the EMD Chemicals Inc. Facility RCRA Voluntary Corrective Action*, June 1, 2004, Prepared for EMD Chemical Inc., Norwood, Ohio (QAPP 2004).

United States Environmental Protection Agency, *3008(h) Administrative Order on Consent, EMD Chemicals Inc., OHD 086 438 538,* March 31, 2010, (U.S. EPA 2010).

United States Environmental Protection Agency, *Documentation of Environmental Indicator Determination, RCRA Corrective Action, Environmental Indicator (EI) RCRIS code (CA 750), Migration of Contaminated Groundwater Under Control*, December 30, 2006, prepared for EMD Chemicals Inc., Cincinnati, Ohio (CA 750, 2006).

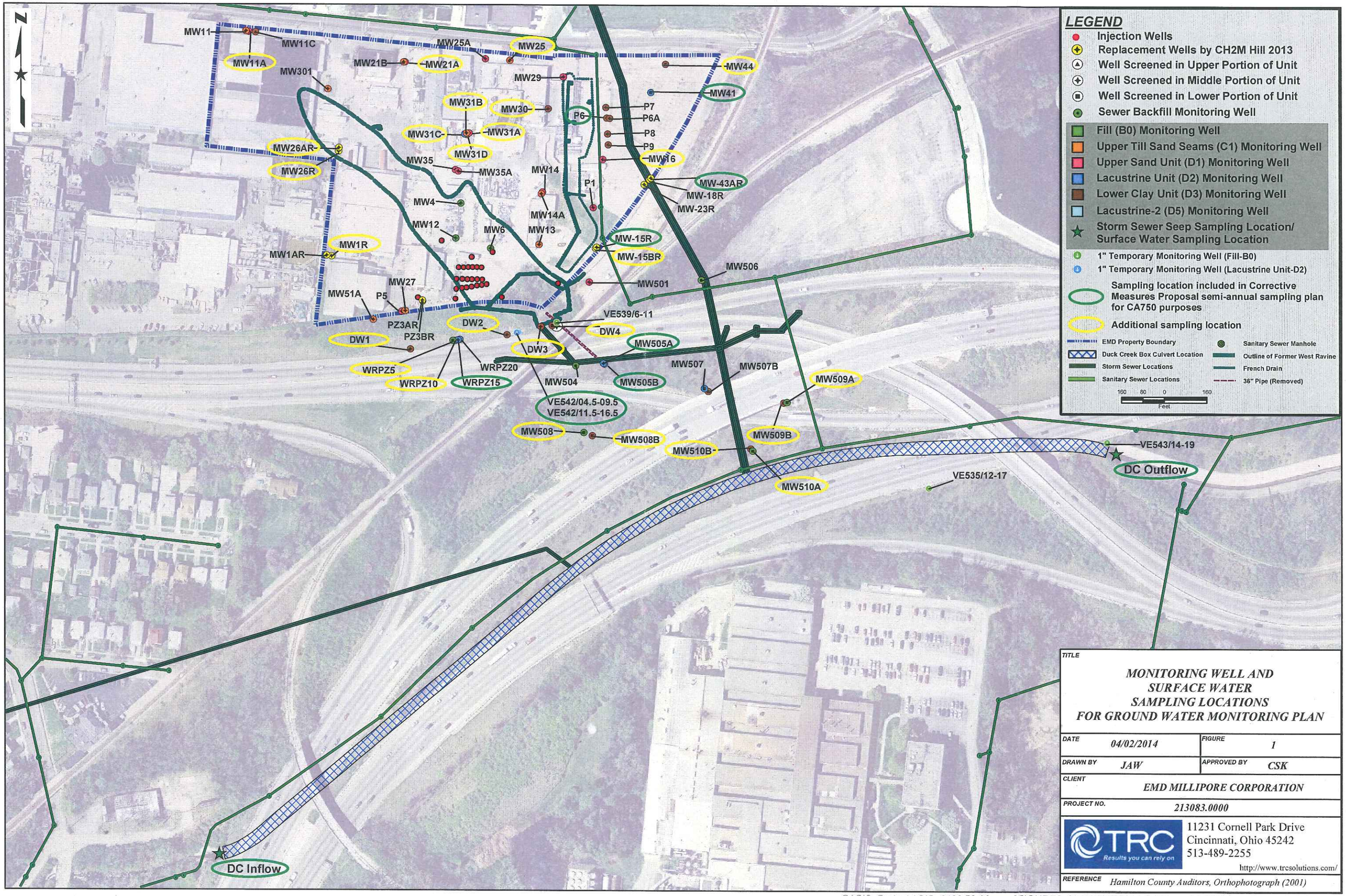
United States Environmental Protection Agency, *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers*, May 2002 U.S. EPA guidance document, (U.S. EPA 2002).

CH2MHill, 2005, *Human Health Risk Assessment Addendum,* November, 2005, prepared for EMD Chemicals Inc., Cincinnati, Ohio (CH2MHill, 2005).

State Coordinating Committee on Ground Water, 1996, *State of Ohio Technical Guidance for Sealing Unused Wells*.

United States Environmental Protection Agency, *Voluntary Corrective Action Agreement Between The United States Environmental Protection Agency and EMD Chemicals Inc., OHD 086 438 538,* September 23, 2004, (Voluntary Agreement 2004).

FIGURES



TITLE

MONITORING WELL AND SURFACE WATER SAMPLING LOCATIONS FOR GROUND WATER MONITORING PLAN

DATE *04/02/2014*	FIGURE *1*
DRAWN BY *JAW*	APPROVED BY *CSK*

CLIENT *EMD MILLIPORE CORPORATION*

PROJECT NO. *213083.0000*

TRC Results you can rely on

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REFERENCE *Hamilton County Auditors, Orthophotograph (2001)*

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TABLES

EMD Chemicals Inc.

Norwood, Ohio
Project No. 213083.03

TABLE 1: Ground Water Elevations

B0 = Fill; C0 = Upper Till Unit; C1 = Upper Till Sand Seams; D1 = Upper Sand Unit; D2 = Lacustrine Unit; D3 = Lower Clay Unit; D4 = Lower Sand Zone; D5 = Lacustrine 2 Zone; E1 = Lacustrine 3 Zone
PVC = Poly Vinyl Chloride; SS = Stainless Steel; Iron = Iron Pipe; NL = Not Listed
fbtoc = feet below top of casing; famsl = feet above mean sea level; DCBC = Duck Creek Box Culvert
State Plane coordinates (NAD83/NAVD88) 2004/2005/2014.

Well ID	Easting	Northing	Top of Casing Elevation (famsl)	Ground Water Elevation (fbtoc)	Ground Water Elevation (famsl)	Total Well Depth (fbtoc)	Casing Diameter (inches)	Casing Material	Geologic Unit Screened
DW001	1419787.08	430079.00	582.50		582.50	30.46	2.00	PVC	D3-Middle
DW002	1419985.28	430108.94	578.44		578.44	27.83	2.00	PVC	D3-Middle
DW003	1420054.60	430125.89	577.10		577.10	29.33	2.00	PVC	D3-Middle
DW004	1420078.14	430128.17	576.79		576.79	42.44	2.00	PVC	D3-Lower
MW004	1419890.20	430376.76	609.85		609.85	11.75	2.00	SS	B0
MW006	1419951.30	430284.88	608.39		608.39	16.19	2.00	SS	B0
MW011	1419451.70	430726.56	617.18		617.18	20.58	2.00	SS	C1
MW011A	1419456.70	430726.09	618.64		618.64	40.14	0.75	Iron	D1
MW011C	1419470.90	430724.79	616.17		616.17	51.47	2.00	SS	D3-Upper
MW012	1419879.40	430305.53	609.03		609.03	24.93	2.00	SS	B0
MW013	1420051.30	430292.75	610.41		610.41	22.71	2.00	SS	C1
MW014	1420057.80	430400.11	610.39		610.39	31.19	2.00	SS	D1
MW014A	1420055.70	430396.89	611.16		611.16	15.96	0.75	Iron	C1
MW016	1420181.30	430466.79	596.59		596.59	36.99	2.00	SS	D1
MW021A	1419776.50	430664.08	611.20		611.20	33.63	2.00	SS	D1
MW021B	1419774.00	430664.23	611.17		611.17	21.88	2.00	SS	C1
MW025	1419991.30	430667.55	606.19		606.19	20.85	2.00	SS	C1
MW025A	1419940.50	430670.88	607.98		607.98	41.98	2.00	SS	D1
MW027	1419776.90	430157.16	610.18		610.18	21.28	2.00	SS	C1
MW029	1420099.80	430635.41	602.99		602.99	33.29	2.00	SS	D1
MW030	1420070.00	430570.20	608.48		608.48	72.50	2.00	SS	D3-Middle
MW031A	1419906.70	430519.78	610.45		610.45	35.25	2.00	SS	D1
MW031B	1419902.20	430520.02	610.43		610.43	25.03	2.00	SS	C1
MW031C	1419898.50	430517.80	609.95		609.95	51.30	2.00	SS	D2-Lower
MW031D	1419903.10	430516.72	609.91		609.91	61.90	2.00	SS	D3-Upper
MW035	1419879.20	430445.33	608.96		608.96	32.46	2.00	SS	D1
MW035A	1419884.60	430441.64	609.00		609.00	34.00	4.00	PVC	D1
MW041	1420279.20	430603.59	595.04		595.04	55.34	2.00	SS	D2-Lower
MW044	1420308.50	430661.26	594.73		594.73	56.03	2.00	SS	D3-Lower
MW051A	1419710.70	430138.92	609.31		609.31	22.21	2.00	SS	C1
MW301	1419617.80	430609.13	612.43		612.43	23.50	2.00	SS	C1
MW505A	1420182.20	430051.41	571.78		571.78	13.60	2.00	SS	D2-Middle
MW505B	1420183.50	430050.20	571.70		571.70	21.38	2.00	SS	D2-Lower
MW506	1420382.30	430221.60	566.76		566.76	14.05	2.00	SS	Sewer Backfill
MW507	1420388.10	430000.81	568.67		568.67	19.30	2.00	SS	D2-Lower
MW507B	1420395.58	429994.67	569.35		569.35	27.08	2.00	PVC	D3-Lower
MW508	1420141.80	429909.99	590.51		590.51	36.49	2.00	SS	B0-Lower
MW508B	1420159.30	429904.31	590.35		590.35	50.12	2.00	PVC	D3-Lower
MW509A	1420557.33	429973.21	566.09		566.09	18.71	2.00	PVC	B0-Lower

EMD Chemicals Inc.
Norwood, Ohio
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TABLE 1: Ground Water Elevations

B0=Fill; C0=Upper Till Unit; C1=Upper Till Sand Seams; D1=Upper Sand Unit; D2=Lacustrine Unit; D3=Lower Clay Unit; D4=Lower Sand Zone; D5=Lacustrine 2 Zone; E1=Lacustrine 3 Zone
PVC=Poly Vinyl Chloride; SS=Stainless Steel; Iron=Iron Pipe; NL=Not Listed
fbtoc=feet below top of casing; famsl=feet above mean sea level; DCBC=Duck Creek Box Culvert
State Plane coordinates (NAD83/NAVD88) 2004/2005/2014.

Well ID	Easting	Northing	Top of Casing Elevation (famsl)	Ground Water Elevation (fbtoc)	Ground Water Elevation (famsl)	Total Well Depth (fbtoc)	Casing Diameter (inches)	Casing Material	Geologic Unit Screened
MW031B	1419902.20	430520.02	610.43		610.43	25.03	2.00	SS	C1
MW031C	1419898.50	430517.80	609.95		609.95	51.30	2.00	SS	D2-Lower
MW031D	1419903.10	430516.72	609.91		609.91	61.90	2.00	SS	D3-Upper
MW035	1419879.20	430445.33	608.96		608.96	32.46	2.00	SS	D1
MW035A	1419884.60	430441.64	609.00		609.00	34.00	4.00	PVC	D1
MW041	1420279.20	430603.59	595.04		595.04	55.34	2.00	SS	D2-Lower
MW044	1420308.50	430661.26	594.73		594.73	56.03	2.00	SS	D3-Lower
MW051A	1419710.70	430138.92	609.31		609.31	22.21	2.00	SS	C1
MW301	1419617.80	430609.13	612.43		612.43	23.50	2.00	SS	C1
MW505A	1420182.20	430051.41	571.78		571.78	13.60	2.00	SS	D2-Middle
MW505B	1420183.50	430050.20	571.70		571.70	21.38	2.00	SS	D2-Lower
MW506	1420382.30	430221.60	566.76		566.76	14.05	2.00	SS	Sewer Backfill
MW507	1420388.10	430000.81	568.67		568.67	19.30	2.00	SS	D2-Lower
MW507B	1420395.58	429994.67	569.35		569.35	27.08	2.00	PVC	D3-Lower
MW508	1420141.80	429909.99	590.51		590.51	36.49	2.00	SS	B0-Lower
MW508B	1420159.30	429904.31	590.35		590.35	50.12	2.00	PVC	D3-Lower
MW509A	1420557.33	429973.21	566.09		566.09	18.71	2.00	PVC	B0-Lower
MW509B	1420550.88	429971.94	566.07		566.07	26.45	2.00	PVC	D3-Lower
MW510A	1420487.41	429873.49	569.66		569.66	15.75	2.00	PVC	B0-Lower
MW510B	1420482.86	429877.57	570.01		570.01	29.21	2.00	PVC	D3-Lower
P001	1420161.30	430368.72	599.77		599.77	30.67	2.00	SS	D1
P005	1419770.40	430155.51	610.81		610.81	30.51	2.00	SS	D1

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fbtoc=feet below top of casing; famsl=feet above mean sea level; DCBC=Duck Creek Box Culvert
State Plane coordinates (NAD83/NAVD88) 2004/2005/2014.

Well ID	Easting	Northing	Top of Casing Elevation (famsl)	Ground Water Elevation (fbtoc)	Ground Water Elevation (famsl)	Total Well Depth (fbtoc)	Casing Diameter (inches)	Casing Material	Geologic Unit Screened
P006	1420188.70	430551.39	595.52		595.52	54.00	2.00	SS	D3-Middle
P006A	1420194.80	430550.52	592.40		592.40	53.20	4.00	PVC	D3-Middle
P007	1420187.30	430572.84	594.95		594.95	48.85	2.00	PVC	D3-Middle
P008	1420190.70	430518.84	595.80		595.80	49.30	2.00	PVC	D3-Middle
P009	1420192.10	430496.79	596.64		596.64	52.04	2.00	PVC	D3-Middle
WRPZ05	1419873.72	430096.79	579.85		579.85	5.06	1.00	PVC	B0-Lower
WRPZ10	1419879.15	430096.96	579.67		579.67	9.95	1.00	PVC	D2-Middle
WRPZ15	1419884.16	430098.11	579.45		579.45	14.80	1.00	PVC	D2-Middle
WRPZ20	1419888.47	430098.89	579.39		579.39	19.50	1.00	PVC	D2-Lower
VE535/12-17	NS	NS	NS		NS	17.00	1.00	PVC	B0-Lower
VE539/06-11	1420086.44	430133.81	576.68		576.68	11.00	1.00	PVC	B0-Lower
VE542/04.5-09.5	1420008.24	430113.43	578.31		578.31	9.50	1.00	PVC	D2-Upper
VE542/11.5-16.5	1420006.04	430112.95	578.29		578.29	16.50	1.00	PVC	D2-Lower
VE543/14-19	NS	NS	NS		NS	16.50	1.00	PVC	B0-Lower
MW26AR	1419640.73	430489.15	610.61		610.61	59.70	2.00	PVC	D3 - Middle
MW26R	1419640.02	430482.06	610.75		610.75	41.97	2.00	PVC	D1
MW01R	1419625.69	430268.36	608.24		608.24	33.25	2.00	PVC	C1
MW01AR	1419615.57	430270.15	608.20		608.20	31.63	2.00	PVC	C1
PZ-3AR	1419812.72	430177.14	606.89		606.89	31.63	2.00	PVC	TBD
PZ-3BR	1419812.48	430178.55	606.98		606.98	48.30	2.00	PVC	TBD
MWTM-1	NS	NS	NS		NS	NM	2.00	PVC	D2
PZ-5A	1419984.47	430215.73	606.86		606.86	44.50	2.00	PVC	D2
PZ-5B	1419984.52	430221.09	606.75		606.75	59.00	2.00	PVC	D3
PZ-6	1420057.81	430209.47	606.29		606.29	40.00	2.00	PVC	D2

EMD Chemicals Inc.
Norwood, Ohio
Project No. 213083.03

TABLE 1: Ground Water Elevations

B0=Fill; C0=Upper Till Unit; C1=Upper Till Sand Seams; D1=Upper Sand Unit; D2=Lacustrine Unit; D3=Lower Clay Unit; D4=Lower Sand Zone; D5=Lacustrine 2 Zone; E1=Lacustrine 3 Zone
PVC=Poly Vinyl Chloride; SS=Stainless Steel; Iron=Iron Pipe; NL=Not Listed
fbtoc=feet below top of casing; famsl=feet above mean sea level; DCBC=Duck Creek Box Culvert
State Plane coordinates (NAD83/NAVD88) 2004/2005/2014.

Well ID	Easting	Northing	Top of Casing Elevation (famsl)	Ground Water Elevation (fbtoc)	Ground Water Elevation (famsl)	Total Well Depth (fbtoc)	Casing Diameter (inches)	Casing Material	Geologic Unit Screened
PZ-4	1419941.53	430295.72	605.48		605.48	43.00	2.00	PVC	D2
MW15BR	1420167.97	430288.20	600.53		600.53	54.45	2.00	PVC	D3 - Upper
MW15R	1420165.41	430285.65	600.58		600.58	28.60	2.00	PVC	D1
MW23R	1420265.32	430416.46	597.30		597.30	38.98	2.00	PVC	B0
MW18R	1420276.27	430426.26	597.23		597.23	39.00	2.00	PVC	B0
MW43AR	1420279.10	430429.00	597.43		597.43	52.20	2.00	PVC	D2-Lower

NS - not surveyed
NM - not measured

EMD Chemicals Inc.
Cincinnati, Ohio
Project No. 193920.00004

Table 2: Post Corrective Measures 2014 Monitoring Event Information

On-Property Monitoring Wells										
Well ID	Unit Monitored	Total Depth (for reference only)	Sample ID	Analytical Method	# of Sample Containers	Preservative	QA/QC Samples	QA/QC Sample ID	QA/QC Sample Analysis	Located in Construction Zone
MW-01R	Upper Till Sand Seams	33.25	MW001R/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW11A	Upper Sand	40.14	MW011A/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW-15BR	Lower Clay - Upper	54.45	MW015BR/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW21A	Upper Sand	33.63	MW021A/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW-30	Lower Clay - Middle	72.50	MW030/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW44	Lacustrine - Lower	56.03	MW044/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW-26R	Upper Sand	41.97	MW026R/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW-26AR	Lower Clay-Middle	59.70	MW026AR/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW16	Upper Sand	36.99	MW016/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW25	Upper Till Sand Seams	20.85	MW025/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW31B	Upper Till Sand Seams	25.03	MW031B/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW31A	Upper Sand	35.25	MW031A/[date]	VOC-8260	12-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW31D	Lower Clay - Upper	61.90	MW031D/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW31C	Lacustrine - Lower	51.30	MW031C/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW41	Lacustrine - Lower	55.34	MW041/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
P6	Lower Clay - Middle	54.00	P006/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW-15R	Upper Sand	28.60	MW015R/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW-43AR	Lacustrine - Lower	52.20	MW043AR/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No

EMD Chemicals Inc.
Cincinnati, Ohio
Project No. 193920.00004

Table 2: Post Corrective Measures 2014 Monitoring Event Information

On-Property Monitoring Wells										
Well ID	**Unit Monitored**	**Total Depth (for reference only)**	**Sample ID**	**Analytical Method**	**# of Sample Containers**	**Preservative**	**QA/QC Samples**	**QA/QC Sample ID**	**QA/QC Sample Analysis**	**Located in Construction Zone**
Off-Property Monitoring Wells										
Well ID	**Unit Monitored**	**Total Depth (for reference only)**	**Sample ID**	**Analytical Method**	**# of Sample Containers**	**Preservative**	**QA/QC Samples**	**QA/QC Sample ID**	**QA/QC Sample Analysis**	**Located in Construction Zone**
DW001	Lower Clay - Lower	30.46	DW001/[date}	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
DW002	Lower Clay - Middle	27.83	DW002/[date}	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
DW003	Lower Clay - Middle	29.33	DW003/[date}	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
DW004	Lower Clay - Lower	42.44	DW004/[date}	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
WRPZ05	Fill - Lower	5.06	WRPZ05/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
WRPZ10	Lacustrine - Middle	9.95	WRPZ10/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW508	Fill - Lower	36.49	MW508/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW508B	Lower Clay - Lower	50.12	MW508B/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW509A	Fill - Middle	18.71	MW509A/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW509B	Lower Clay - Lower	26.45	MW509B/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW510A	Fill - Middle	15.75	MW510A/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW510B	Lower Clay - Lower	29.21	MW510B/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW505A	Lacustrine - Middle	13.6	MW505A/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
MW505B	Lacustrine - Lower	21.38	MW505B/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
VE542/04.5-09.5	Lacustrine - Upper	9.50	VE542/04.5-09.5/[date]	VOC-8260	12-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
VE542/11.5-16.5	Lacustrine - Lower	16.50	VE542/11.5-16.5/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
WRPZ15	Lacustrine - Middle	14.80	WRPZ15/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No

EMD Chemicals Inc.
Cincinnati, Ohio
Project No. 193920.00004

Table 2: Post Corrective Measures 2014 Monitoring Event Information

On-Property Monitoring Wells										
Well ID	**Unit Monitored**	**Total Depth (for reference only)**	**Sample ID**	**Analytical Method**	**# of Sample Containers**	**Preservative**	**QA/QC Samples**	**QA/QC Sample ID**	**QA/QC Sample Analysis**	**Located in Construction Zone**
Surface Water Sampling Locations										
Well ID	**Unit Monitored**	**Total Depth (for reference only)**	**Sample ID**	**Analytical Method**	**# of Sample Containers**	**Preservative**	**QA/QC Samples**	**QA/QC Sample ID**	**QA/QC Sample Analysis**	**Located in Construction Zone**
Duck Creek Inflow**	Surface Water	NA	DC INFLOW/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No
Duck Creek Outflow**	Surface Water	NA	DC OUTFLOW/[date]	VOC-8260	3-40 ml vials (VOC)	ice, HCl	NA	NA	NA	No

Sampling location included in Corrective Measures Proposal semi-annual sampling plan for CA750
Additional sampling location. Contingency Post CA750 Verification Monitoring

NA = not applicable
* = indicate MS/MSD under "Special Instructions/Conditions of Receipt" on chain of custody
** = samples should be collected on the same day

Other QA/QC Samples			
Sample Type	**Sample ID**	**Analysis**	**Comments**
Duplicate	DUP01/[date], DUP02/[date]	VOC-8260	Total of 2 Duplicate Samples; DUP01 collected on property, DUP02 collected off property
Matrix Spike/Matrix Spike Duplicate	Sample ID/[date]/MS, Sample ID/[date]/MSD	VOC-8260	Total of 2 MS/MSD Sample; one collected for every 20 samples
Trip Blank	TB01/[date], TB02/[date]	VOC-8260	Sent with every shipment of VOC samples
Field Blank	FB01/[date], FB02/[date]	VOC-8260	Total of 2 Field Blank Samples; FB01 collected on property, FB02 collected off property
Rinsate	RIN01/[date]	VOC-8260	Collect one rinsate sample per every 20 wells sampled using non-dedicated pumps